The Accuracy of Students' Novice, Apprentice, Proficient, and Distinguished Classifications of the Kentucky Core Content Test for 1999

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The purpose of this report is to represent classification accuracy statistics for the Kentucky Core Content Test in as non-technical language as possible. The Kentucky Core Content Test is administered to subjects in 18 grade/subject combinations, identified in Table 1. For scoring and reporting, each grade/subject combination is treated as a separate test. As a result of these tests, each student is assigned one of four proficiency levels: Novice, Apprentice, Proficient, or Distinguished (NAPD). Scoring is actually a two-step process. Students first receive a scale score derived from their responses to the items on the test. Scoring is described in Kentucky Department of Education (KDE) technical manuals (KDE, 1995; KDE, 1997). "Cut points" have been set in previous standard setting studies (KDE, 1995; KDE, 1997) which divide the scale score range into the four NADP proficiency categories. Students are assigned the NAPD level matching their scale score. Because no test is perfect, the assignment of students to NAPD levels is not expected to be perfect either. Tests, however, are useful when the accuracy level is acceptable high. This report examines the accuracy of the Kentucky Core Content Test NAPD assignments, given what we know about the psychometric statistics of the test.

Table 1
Grade/Subject Combinations for the Kentucky Core Content Test

Subject	Grade					
	4	5	7	8	10	11
Reading	X		X		X	
Mathematics		X		X		X
Science	X		X			X
Social Studies		X		X		X
Arts and Humanities (A&H)		X		X		X
Vocational Living and Practical Studies (PL/VS)		X		X	X	

The methodology for this classification accuracy analysis was developed by Hoffman and Wise (1999) and presented to Kentucky's National Technical Advisory Panel on Assessment and Accountability (NTAPAA) on two occasions (September 9-10, 1999 and December, 16-17, 1999). The method was approved by the NTAPAA during the September meeting. Preliminary results were presented during the December meeting, and during that meeting, a request was made to revise the display of the data. This report conforms to the NTAPAA reporting specifications. The classification accuracy method was also presented to the National Council for Measurement in Education (NCME) at its annual meeting in April, 2000. The NCME paper (Hoffman & Wise, 2000) is available from the authors or at www.Humrro.org under "Research Profiles." That paper also explored some important implications of the nature of test scores that are commonly overlooked. Because Kentucky is about to embark on new standard setting efforts for each grade/subject combination, some implications drawn from the NCME paper will be briefly introduced in the conclusion section of this paper.

Classification Accuracy

Before presenting the results, a few concepts need to be reviewed. As mentioned above, no test is perfect. What that means to the psychometrician is that an observed test score is the product of two factors: true proficiency in the knowledge area being assessed and measurement error that comes from a variety of sources. For example, a given student may be strong in some areas of mathematics and weak in others. If the test's content is well-balanced, then students should be able to show their strengths, but also expose their weaknesses, and the total test scores should be close to their true proficiencies. On the other hand, if the test is out of balance, then scores for some students' may be too high and some too low, depending on whether the content they know is over- or under-emphasized by the test.

Unfortunately, we cannot know students' true achievement levels. We can only estimate them from the fallible test scores. That is, obtained scores are known, but true scores are unknown. Using test reliability statistics however, it is possible to provide estimations which answer the following two questions:

- For a given obtained score, what are the odds that true proficiency is in the same NAPD classification?
- For that same given obtained score, what are the odds that true proficiency is in one of the other NAPD classifications?

These two questions lead to 16 probability estimates: That is, for each of the four assigned NAPD proficiency levels, what are the odds that true proficiency is in any of the four NAPD levels? The attached classification accuracy tables, one for each grade/subject combination, present these 16 estimates.

A caveat

Each Kentucky Core Content Test grade/subject assessment is composed of either 12 forms for A&H and PL/VS or 6 forms for the rest of the subjects. Because the items in the forms do not overlap and because students take only one form, there is no way to determine if students would obtain their same test scores if they had taken different forms of the test. That is, differences in content coverage across test forms could lead to individual students scoring higher or lower on one form versus another. Given the Spring 2000 test administration design, we simply do not have a way to estimate the extent of this type of effect. CTB has proposed an alternative form design that includes some overlap in test items in order to help solve this uncertainty in future years.

Reading the Classification Accuracy Tables using Grade 4 Reading, as an Example

The numbers in the tables are percentages of all students[1], so that the sum of all of the italicized percents is 100. The "Total Assigned" row indicates the percent of students who were actually assigned each of the four NAPD classifications. In Table 2, for example, 3.56% of all Grade 4 students who took the Kentucky Core Content Test Reading test received test scores that placed them in the Novice category. Likewise, 64.13% of all students received test scores within

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[1] Analyses were conducted on all "non-exempted" students only, so that "all students" actually means all non-exempt students.

the score range for the Apprentice category; 31.11% were Proficient; and 1.20% were Distinguished.

Test scores are not perfect, so some proportion of students is expected to have true achievement in categories that match their assigned categories and another proportion of students is expected to have true achievement that falls in categories other than their assigned categories. The bold numbers in Table 2 indicate accurate classifications. That is, 2.35% of all students are expected to be accurately classified as Novice, 58.33% of all students are expected to be accurately classified as Apprentice, 24.89% of all students are expected to be accurately classified as Proficient, and finally 0.53% of all students are expected to be accurately classified as Distinguished. The sum of these four percentages, noted in the last row of the table as 86.09%, gives the percent of all students who are expected to be accurately classified given their obtained test score. That is, based on their less-than-perfect test scores, approximately 86% of all Grade 4 students would be expected to be assigned to the same category of proficiency as would be expected if we actually knew their true achievement.

The non-bold numbers in Table 2 indicate the proportions of students that are expected to have true achievement classifications that are different than the classification assigned from their test scores. For example, 1.21% of all students are expected to have obtained test scores that place them in the Novice range while their true achievement would place them one category higher in the Apprentice category. Conversely, 0.46% of all students are expected to have obtained test scores that place them in the Apprentice category, while their true achievement would place them one category lower in the Novice category. Another 5.34% of all students are expected to have obtained test scores that also place them in the Apprentice category, while their true achievement would place them one category higher in the Proficient category. In total, 13.91% (1-86.09%) of all students are expected to be misclassified.

You may note that the percentages could be calculated in another way. For example, most of the students (64.13%) were assigned Apprentice scores. Of those students who were assigned to the Apprentice category, approximately 91% (58.33 divided by 64.12) are expected to be accurately classified and approximately 9% misclassified. This alternate view illustrates that while most of the errors occur in the middle two categories (5.34% + 6.02%), classification in those two categories is more accurate than in the two extreme categories. For example, there are only 3.56% of all students in the Novice range, but the classification accuracy within that category is only 66%. The classification accuracy is even less for the approximately 1% of the students in the Distinguished category. Over half of these students are expected have true proficiency that is actually in the Proficient range. The general rule is this: Larger rates of error occur for the extreme scores where there are fewer students. The test is more accurate in the middle range of scores where most of the students are.

Finally, the last column in Table 2 indicates the proportions of students who are expected to have true scores in each of the four proficiency categories. These proportions of students expected to be in each proficiency category are approximately equal (i.e., roughly ± 1 to 1.5%) to the observed proportions in the Total Assigned row of the table. For example, 64.13% of Grade 4 students were assigned an Apprentice classification in Reading. Our projections indicate that a few more, 65.56%, of the students are expected to have true achievement that is at the Apprentice level.

Table 3 through 19 provide the classification accuracy projections for Kentucky Core Content Tests for each of the remaining grades and subjects. Note that, because of rounding in the tabled numbers, the row and column totals may not add up exactly. Each tabled number is the best representation, rounded to two decimals. In one case, Grade 7 Science, three decimals were retained for several values in order to avoid confusion.

Summary of the Results

Students classification accuracy varies between approximately 75% (Grade 11 Mathematics, Grade 5 Practical Living/Vocational Studies, and Grade 10 Practical Living/Vocational Studies) to over 90% (for Grade 7 Reading and Grade 11 Science). The median classification accuracy is 82%. These numbers must be interpreted in light of the fact that if there were to be such a thing as a perfect test, it would have to be so perfect that sufficient decimals could be computed to avoid any score falling on one of the cut points that divide categories. Otherwise, scores on the cut point could be either assigned to the higher category or to the lower with no certainty either way. Essentially, inaccuracy in assigning classifications is inevitable.

For nine of the tests, classification accuracy is large enough so that all students are expected to have true proficiency that is no more than one category away from his/her assigned category. For eight of the remaining nine tests, the chances are greater than 99% of having true proficiency that is at least within two categories of the assigned category. The exception is Grade 5 Arts and Humanities where 1.22% of the students will have been assigned Distinguished when their true proficiency is only Apprentice.

There is however a slight, but noticeable, systematic pattern in the differences between observed classifications and expected true classifications. For all grade/subject combinations there are more students assigned to the Distinguished category than expected based on our projections of true achievement. In addition, in 17 of the 18 grade/subject combinations there are more students assigned to the Proficient category assigned than expected from our true achievement projections. Hoffman and Wise (2000) explored the nature of this effect. As noted above, these categories are extreme scores, in the sense that relatively few students are in the score range for Proficient and Distinguished. Students with high test scores are not likely to have true achievement that is as high as the test score indicates and students with low test scores are not likely to have true achievement that is as low as the test score indicates. The cutpoint for Distinguished is high enough to see the effects of this "regression to the mean." For 11 of the 18 grade/subject combinations, students with Distinguished classifications have greater odds of having true achievement that is in the Proficient range than in the Distinguished range.

We need to emphasize that this systemic error affects few students. Furthermore, because the inaccuracy is associated primarily with extreme scores, as the population of students shifts to higher scores in the future, Proficient and Distinguished scores will become less extreme and therefore have more accuracy.

The classification accuracy data also has important implications for school accountability scores. School accountability scores are a function of all students' classifications. Some of the inevitable classification error will be in one direction and some in the other. That is, some

students will be classified higher than their true proficiency and some will be classified lower. The percentages of students actually assigned to each category versus our projections of the percent of students expected to have true achievement at each level shows that the misclassification errors do tend to balance out. Comparing expected and assigned percentages for across all grades and subjects, the absolute difference (i.e., ignoring the direction of the difference) between percent assigned and percent expected ranges from a negligible .02 to 5.8. The median is approximately 1%. Therefore, the observed distribution of students matches the expected distribution of students with about 99% accuracy.

In general, the pattern of results appears to support the use of students' classifications for calculating school scores. However, as KDE prepares to reset its standards, it should consider more closely the "regression to the mean" affect described above. Actual test scores have larger variation than true proficiency scores. Therefore, translation of cut scores from one scale to another needs to take this into account. Current standard setting typically ignores this difference and as a result we see systemic bias in classification.

The implications of the data for students is less clear. There are currently no state endorsed uses of Kentucky Core Content Test scores for individual students. However, the NTAPAA has been charged with making a recommendation about whether students' test scores should be recorded on their report cards. The data in this report should inform their decision.

Perspective on the results

Test specialists are currently in the early stages of recognizing the need to study classification accuracy as well as more traditional measures of test reliability. Currently, investigations of classification accuracy tend to be methodological papers which focus on analytical variations on the accuracy theme. It is instructive to examine several of these studies that use operational data. For example, Rogosa (1994) examined 1993 California's CLAS assessment which uses six proficiency levels. He found that although the probability of classification within one category of true proficiency was nearly 95%, the probability of exact classification was only 51.72%. Rogosa (2000) has provided similar data for other assessments, including California's current assessment, STAR, along with a warning that test accuracy is often not as good as we think it is.

In another example, Lee, Hanson, and Brennan (2000) used data from ACT's Work Keys assessment. Their results confirm that number of proficiency categories makes a difference – more categories mean more opportunities of classification error and therefore less accuracy. For a Work Keys subtest with five categories, exact accuracy for several different forms was in the 70% range, while a subtest with six categories showed accuracy in the low- to mid-60% range. Lee et al also looked at accuracy for classifying students simply above or below a single cutpoint, and they used each of the possible Work Keys cutpoints to look at these dichotomous classifications. Accuracy was in the upper 80% range to near 100% for classifying students into only one of two categories. The higher levels of accuracy occurred for classification of students into either extreme. When the cutpoint was more near the center, accuracy tended to be in the upper 80% range. Young and Yoon (1998) provide some similar data from the New Standards assessments. Again, when making only a dichotomous (two category) classification, they showed accuracy in the lower 90% range.

For comparison purposes, we can calculate accuracy for the Kentucky Core Content Test as if it were used to divide students into two category created by combining Novice with Apprentice and Proficient with Distinguished. Looking at the data in Table 2 from this perspective, some to the cells that preciously represented misclassification, now be represent accurate classification. Accuracy, therefore, becomes the sum of the four cells in the upper left plus the sum of the four cells in the lower right. The resulting "dichotomous" accuracy of "Apprentice and below" versus "above Apprentice" is approximately 89%. Across all grade/subject combinations, this dichotomous accuracy is in the mid-80% to mid-90% range, estimates which are comparable to Work Keys and New Standards.

Given these example, the Kentucky Core Content Test appears to have classification accuracy statistics that are similar of other educational proficiency assessments. Again, the NTAPAA must determine whether the observed level of accuracy is sufficient placement on students' transcripts. However, the standard testing industry caveat is that no test score should be used by itself to make a decision, particularly if that decision has high-stakes for students. We have also seen in this report that individual level inaccuracies do tend to cancel out so that the distributions of students' score appear to be reasonably precise.

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Table 2
Expected Proportions of Students' True Classifications Being in Each Possible Classifications Given Their Assigned Classification for Grade 4 Reading

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**2.35**	0.46	0.00	0.00	2.81
Apprentice	1.21	**58.33**	6.02	0.00	65.56
Proficient	0.00	5.34	**24.89**	0.67	30.90
Distinguished	0.00	0.00	0.20	**0.53**	0.74
Total Assigned	3.56	64.13	31.11	1.20	100

Note: Bold numbers indicate proportions of all students with true classification and observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 4 Reading = 86.09%

Table 3
Expected Proportions of Students' True Classifications Being in Each Possible Classifications Given Their Assigned Classification for Grade 7 Reading

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**2.15**	0.49	0.00	0.00	2.64
Apprentice	1.10	**81.41**	3.42	0.00	85.93
Proficient	0.00	2.27	**8.93**	0.12	11.32
Distinguished	0.00	0.00	0.01	**0.09**	0.10
Total Assigned	3.25	84.18	12.36	0.21	100.00

Note: Bold numbers indicate proportions of all students with true classification and observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 7 Reading = 92.58%

Table 4
Expected Proportions of Students' True Classifications Being in Each Possible Classifications Given Their Assigned Classification for Grade 10 Reading

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**13.04**	2.26	0.00	0.00	15.31
Apprentice	3.16	**49.00**	4.67	0.00	56.84
Proficient	0.00	3.69	**21.79**	0.79	26.28
Distinguished	0.00	0.00	0.45	**1.13**	1.58
Total Assigned	16.21	54.96	26.91	1.92	100.00

Note: Bold numbers indicate proportions of all students with true classification and observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 10 Reading = 84.97%

Table 5
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 5 Mathematics

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**19.07**	3.95	0.00	0.00	23.01
Apprentice	4.72	**46.99**	4.05	0.56	56.32
Proficient	0.00	3.25	**4.49**	2.80	10.54
Distinguished	0.00	0.53	1.78	**7.81**	10.12
Total Assigned	23.79	54.72	10.32	11.17	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 5 Mathematics $= 78.36\%$

Table 6
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 8 Mathematics*

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**25.47**	4.93	0.04	0.00	30.44
Apprentice	4.74	**27.77**	4.79	0.11	37.41
Proficient	0.00	3.76	**11.53**	3.35	18.64
Distinguished	0.00	0.07	2.30	**11.14**	13.52
Total Assigned	30.21	36.53	18.66	14.61	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 8 Mathematics $= 75.90\%$
*A documented anomaly in Form 5 (that did not affect NAPD classifications) led to its
removal from this analysis.

Table 7
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 11 Mathematics

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**20.29**	5.50	0.21	0.03	26.03
Apprentice	5.50	**32.19**	5.54	0.05	43.28
Proficient	0.00	3.51	**14.95**	2.37	20.83
Distinguished	0.00	0.01	1.59	**8.25**	9.86
Total Assigned	25.79	41.20	22.31	10.70	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 11 Mathematics $= 75.68\%$

Table 8
Expected Proportions of Students' True Classifications Being in Each Possible Classifications Given Their Assigned Classification for Grade 4 Science

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**10.93**	2.69	0.00	0.00	13.62
Apprentice	4.71	**74.99**	2.72	0.00	82.42
Proficient	0.00	1.23	**2.53**	0.15	3.91
Distinguished	0.00	0.00	0.01	**0.02**	0.04
Total Assigned	15.64	78.91	5.27	0.18	100.00

Note: Bold numbers indicate proportions of all students with true classification and observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 4 Science $= 88.48\%$

Table 9
Expected Proportions of Students' True Classifications Being in Each Possible Classifications Given Their Assigned Classification for Grade 7 Science

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**36.47**	6.06	0.00	0.00	42.53
Apprentice	5.73	**51.49**	0.15	0.00	57.37
Proficient	0.00	0.03	**0.05**	0.015	0.09
Distinguished	0.00	0.00	0.00	**0.003**	0.00
Total Assigned	42.20	57.58	0.20	0.02	100.00

Note: Bold numbers indicate proportions of all students with true classification and observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 7 Science $= 88.01\%$

Table 10
Expected Proportions of Students' True Classifications Being in Each Possible Classifications Given Their Assigned Classification for Grade 11 Science

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**3.63**	0.66	0.00	0.00	4.29
Apprentice	2.60	**78.80**	3.78	0.00	85.18
Proficient	0.00	2.27	**7.59**	0.32	10.19
Distinguished	0.00	0.00	0.11	**0.23**	0.34
Total Assigned	6.23	81.74	11.48	0.55	100.00

Note: Bold numbers indicate proportions of all students with true classification and observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 11 Science $= 90.26\%$

Table 11
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 5 Social Studies

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	*15.98*	*3.56*	*0.00*	*0.00*	19.54
Apprentice	*4.95*	*60.64*	*3.95*	*0.00*	69.54
Proficient	*0.00*	*2.37*	*7.95*	*0.38*	10.70
Distinguished	*0.00*	*0.00*	*0.05*	*0.18*	0.22
Total Assigned	20.93	66.57	11.94	0.55	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 5 Social Studies = 84.75%

Table 12
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 8 Social Studies

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	*26.73*	*4.18*	*0.00*	*0.00*	30.91
Apprentice	*4.53*	*53.34*	*2.59*	*0.00*	60.46
Proficient	*0.00*	*1.74*	*6.33*	*0.27*	8.34
Distinguished	*0.00*	*0.00*	*0.06*	*0.23*	0.29
Total Assigned	31.26	59.25	8.99	0.50	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 8 Social Studies = 86.63%

Table 13
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 11 Social Studies

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	*13.43*	*2.64*	*0.00*	*0.00*	16.07
Apprentice	*3.43*	*46.76*	*4.71*	*0.00*	54.90
Proficient	*0.00*	*4.02*	*21.13*	*1.15*	26.29
Distinguished	*0.00*	*0.00*	*0.64*	*2.10*	2.74
Total Assigned	16.86	53.42	26.48	3.24	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 11 Social Studies = 83.41%

Table 14
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 5 Arts and Humanities

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**60.03**	*9.39*	*0.03*	*0.00*	69.45
Apprentice	*7.51*	**18.25**	*1.68*	*1.22*	28.65
Proficient	*0.02*	*0.27*	**0.18**	*0.72*	1.19
Distinguished	*0.00*	*0.04*	*0.03*	**0.63**	0.70
Total Assigned	67.56	27.94	1.92	2.58	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 5 Arts and Humanities = 79.09%

Table 15
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 8 Arts and Humanities

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**44.98**	*7.98*	*0.01*	*0*	52.98
Apprentice	*7.51*	**31.67**	*2.76*	*0.25*	42.19
Proficient	*0.01*	*1.2*	**1.5**	*0.9*	3.62
Distinguished	*0*	*0.07*	*0.12*	**1.02**	1.22
Total Assigned	52.5	40.93	4.39	2.18	100

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 8 Arts and Humanities = 78.18%

Table 16
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 11 Arts and Humanities

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**43.96**	*7.46*	*0.00*	*0.00*	51.43
Apprentice	*7.25*	**36.46**	*1.58*	*0.54*	45.83
Proficient	*0.00*	*0.56*	**0.53**	*0.63*	1.72
Distinguished	*0.00*	*0.08*	*0.07*	**0.87**	1.02
Total Assigned	51.22	44.56	2.18	2.04	100

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 11 Arts and Humanities = 81.82%

Table 17
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 5 Practice Living and Vocational Studies

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**28.65**	8.38	0.00	0.00	37.04
Apprentice	10.72	**45.62**	3.53	0.61	60.48
Proficient	0.01	0.66	**0.81**	0.79	2.27
Distinguished	0.00	0.01	0.01	**0.18**	0.21
Total Assigned	39.38	54.68	4.36	1.59	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 5 PL/VS = 75.26%

Table 18
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 8 Practice Living and Vocational Studies

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**57.65**	8.64	0.20	0.00	66.49
Apprentice	7.12	**17.05**	3.66	0.48	28.30
Proficient	0.14	1.33	**1.63**	1.04	4.14
Distinguished	0.01	0.07	0.13	**0.86**	1.07
Total Assigned	64.91	27.09	5.62	2.37	100.00

Note: Bold numbers indicate proportions of all students with true classification and
Observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 8 PL/VS = 77.19%

Table 19
Expected Proportions of Students' True Classifications Being in Each Possible Classifications
Given Their Assigned Classification for Grade 10 Practice Living and Vocational Studies

Possible True Classification	Assigned Classification				Total Expected in Each True Classification
	Novice	Apprentice	Proficient	Distinguished	
Novice	**44.42**	9.50	0.04	0.00	53.96
Apprentice	8.92	**29.29**	3.08	0.75	42.04
Proficient	0.03	1.07	**0.97**	0.96	3.03
Distinguished	0.00	0.09	0.10	**0.77**	0.96
Total Assigned	53.38	39.96	4.19	2.48	100.00

Note: Bold numbers indicate proportions of all students with true classification and
observed classification being congruent, by classification.
Total congruence (sum of bold numbers) for Grade 10 PL/VS = 75.45%